numerous determinations simultaneously, makes the use of capillary electrokinesis an attractive opportunity.

On page 3, please replace the paragraph starting on line 18 with the following:

Fig. 5 is a bar graph of the inhibition of binding of fluorescent ligand by competing ligand;

On page 8, please replace the paragraph starting on line 13 with the following:

In one embodiment the hydrophilic polymer is a polyether, i.e., a polymer comprising repeating units or monomeric units connected by ether linkages. In one embodiment the polyethers are of at least about 5kDal and may be represented by the formula:

$$-[(CRH)_m-O-(CR^1H)_n-O]_t-$$

wherein R and R1 are independently H, alkyl, cycloalkyl, alkenyl, cycloalkyl ether, cycloalkyl thioether, cycloalkyl silyl ether, and the like, or may be taken together to form a ring of 5 to 7 carbon atoms, preferably, 5 to 6 carbon atoms, which ring may be substituted with one or more substituents, wherein m and n are each independently an integer of 2 to about 10, preferably, about 2 to 4, wherein m is 1 when R and R1 are taken together to form a ring, wherein t is about 2 to about 50,000, preferably, about 500 to about 15,000, and wherein the polymer may terminate in H, hydroxyl, amine, ammonium, carboxylic acid and so forth.

On page 19, please replace the paragraph starting on line 4 with the following:

The microfluidic device unit, which is employed will have a plurality of reservoirs, at least two, and at least one channel. The device may have a plurality of microfluidic units, particularly where the device interfaces with a microtiter well plate. The reservoirs will serve as cell reservoirs, agent reservoirs, waste reservoirs, etc. The reservoirs will generally have volume capacities of from about 0.1 to 20μl, more usually from about 1

to 10μl, to accommodate the desired number of cells, the volume of agents, and waste. The reservoirs will generally have a depth of about 0.2 to 5mm. The channels will vary in depth and width, generally having cross-sections in the range of about 100 to 10,000μm^2, more usually about 200 to 5,000μm^2, where the depth will generally be in the range of about 10 to 100μm, and the width in the range of about 10 to 250μm, where the width will generally be greater than the depth. The materials employed for the device include silicon, glass and plastics, particularly acrylates, although other materials may also be involved, as supports, heat transfer, and the like. Generally, the device will comprise a substrate and a cover, where the substrate will generally have a thickness in the range of about 25μm to 5mm and an adhering cover to enclose the channels, which will generally be of a thickness in the range of about 10 to 100μm. Desirably, the surface of the substrate will be planar. Various openings may be provided in the cover or the substrate, to provide access to the reservoirs and provide access for the electrodes. The manner of use of the device is conventional.

On page 21, please replace the paragraph starting on line 28 with the following:

The cells were introduced into reservoir 2 of a microfluidic device as depicted in Fig. 1. 3μl of 1.5 x 106 cells were introduced into the well with Substance P labeled with Cy5 (140nM) and varying concentrations of SAR-SP, an antagonist for the neurokinin receptor. The channel dimensions were 25 x 75μm and the medium was 150mM NaCl containing 0.5% PEO. The voltages were as follows, the initial number indicating the reservoir and the second number the voltage: 1, 338; 2, 70: 3, 0; and 4, 793. This voltage pattern provided a cell velocity of 44 cells/min past the detector. The detector was placed at a distance of 1.1mm from well 2. The cells were found to move in an orderly fashion down the channel and a response curve obtained by measuring the mean peak height over a 5min interval. The concentrations employed were 0, 10μM, 1μM and 500nM. The observed mean peak heights (RFU) for the total number of cells observed over the 5min interval were 0.13, 0.24, 0.37 and 0.45and respectively. The results are as shown in Fig. 6 with a dose response curve shown in Fig. 7, where the dose response curve has two additional points. The data demonstrate that one can

readily detect concentrations of ligand at or below 500nM, with a fluorescent binding assay and obtain individual peaks, which may then be integrated to give an overall result.

On page 22, please replace the paragraph starting on line 19 with the following:

In the next study, pumping means was employed to move cells through a capillary. The cells were cultured cells having a high level of the fMLP receptor on the surface. The buffer solution was 140mM NaCl, 1mM KH_2PO_4, 5mM Na_2HPO_4, 1.5mM $CaCl_2$, 0.3mM $MgSO_4$, 1mM $MgCl_2$, 0.2% BSA. The cell concentration in the reservoir was 10^6/ml and the receptor concentration was 413pM. The labeled ligand was fluorescein or Cy-5 labeled fMLPK (N-formyl-Met-Leu-Phe-Lys) which competed with fMLP for receptor. The labeled ligand was 4nM, while the ligand concentration was varied from 2.5nM to 250nM. The device was comprised of a reservoir having a volume of 500μl into which was introduced a capillary having an I.D. of 100μm. In place of an electroosmotic pump, a syringe pump operating at 500μl/min applied to the other end of the capillary was employed. The reading was taken at about 100mm from the capillary inlet. The results are shown in Figs. 4 and 5, where TR stands for tracer, RC refers to receptor and TRC refers to both Tracer and Receptor. The cytometric analysis and the bar graph of Figs. 4 and 5 show the height and frequency of peaks with only tracer and only receptor and at various concentrations of ligand, where the bar graph shows the result for 2.5mM in the presence and absence of tracer. At 2.5mM of the ligand, there is substantially no signal. The results demonstrate that one can sensitively distinguish low concentrations of a ligand in the presence of a fluorescent tracer, obtaining signals as to individual cells and combining the results as a total peak area, with a clear differentiation between concentrations as low as 2.5nM and differing by only 5nM.

On page 24, please replace the paragraph starting on line 3 with the following:

In Fig. 2 is depicted a diagrammatic view of a device using two legs for an electroosmotic pump. Device 20 has a cellular reservoir 21 and a reagent reservoir 22. Cellular reservoir 21 is connected to main channel 23 by channel 24, while reagent

reservoir 22 is connected to main channel 23 by channel 25. Channels 23, 24 and 25 meet in a Y to create mixing region. The EOP is formed by reservoir 27 having positive electrode 28, which reservoir is connected to positively charged channel 29 and reservoir 30 with negatively charged electrode 31, which reservoir 30 is connected to negatively charged channel 32. Channels 29 and 32 are connected to main channel 23 at Y 33. As depicted, channels 29 and 32 have a greater cross-section than main channel 23, but all that is required is that the channels of the EOP be large enough to accommodate the flow of liquid from the main channel to provide the desired rate of flow of the cells in the main channel and the desired rate of mixing of the reagents and cells. By controlling the cross-sectional ratio of channels 24 and 25, the ratio of the volume of the cellular medium which is mixed with the reagent medium may be controlled. Alternatively, one may provide valves or other control means to control the ratio of the two media. In operation, the cellular media in reservoir 21 and the reagent media in reservoir 22 are buffered at an appropriate salt concentration for maintaining the viability of the cells. The medium in the main channel 23 and EOP channels 29 and 32 will be of much lower salt concentration for the electroosmotic pumping. By activating electrodes 28 and 31, flow will occur toward reservoirs 27 and 30, so that the cells in reservoir 21 and the reagents in reservoir 22 will move toward the main channel and mix at region 26. The cells will then move down channel 23 at a rate controlled by the voltage differential between electrodes 28 and 31 and move past detector 34, which will evaluate the effect of the reagents on the cells. By appropriate choice of cross-section of channel 24 and media for the cells, clumping and aggregation may be minimized and individual cells moved past the detector 34 to provide independent cytometric analysis.

[On page 24, please replace the paragraph starting on line 30 with the following:

In Fig. 3, dynamic coating is employed for the EOP. The device 50 has a cell reservoir 51 and a reagent reservoir 52, with the former connected to main channel 53 through channel 54 and the latter connected to main channel 53 through channel 55, joining together at Y-junction 56 to form a mixing region. As discussed above, by controlling the cross-sectional ratio of channels 54 and 55, the ratio of mixing of the

cellular media and reagent media will be defined. The EOP is formed by reservoirs 57 and 58 which are connected to main channel 53 by channels 59 and 60 respectively. Channel 60 will have a cross-section large enough to accommodate the flow of liquid from channels 53 and 59, where channel 53 has a cross-section large enough to accommodate the flow of liquid from channels 54 and 55. Thus, the flow from channel 60 into reservoir 58 controls the flow of fluid in the system. By varying the voltage between electrodes 61 and 62 and/or the concentration of the hydrophilic charged polymer in reservoir 57, one can vary the rate at which the cells and the reagents enter the mixing region 56. In the case of a positively charged polymer, the polarity of the device would be set up as follows. The electrode 61 would be negatively charged and reservoir 57 would have the polymer, which would also be included in channels 59 and 60. Electrode 62 would be negatively charged. The media in channels 59 and 60 and reservoirs 57 and 58 would have a salt concentration in the range of about 10 to 50mM. Upon activating the electrodes 61 and 62, liquid would flow from reservoirs 51, 52 and 57 through channels 53 and 59 into channel 60. The cells after reaction with the reagents would move through channel 53 past detector 63. The operation could then be stopped, once the cells have been detected. Where there is a stream of individual cells, the detector could be placed at a site remote from the EOP, so that the cells need never enter the EOP region, although once the cells are past the detector, they will generally be discarded.

In the Claims:

Please cancel claims 2 and 3, without prejudice.

Please replace claims 1, 7, 13, 16, and 17 with the following:

1. (Amended) A method for performing cell-based operations capable of identifying single cell status, employing a microfluidic device having (i) a reservoir containing cells for said cell-based operations, said reservoir containing an appropriate viable cell supporting medium, (ii) a first capillary channel in fluid transfer relationship with said reservoir, (iii) an electroosmotic pump comprising a second capillary channel in fluid receiving relationship with said first channel, (iv) an electrokinetic medium in said second capillary channel and

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